CLAIMS 1-10 ARE CANCELED IN PRE-AMDT

WHAT IS CLAIMED IS:

1. A process of fabricating a thin film semiconductor device, comprising the steps of:

forming a semiconducting thin film on the surface of an insulating substrate spread in longitudinal and lateral directions;

laser-annealing the semiconducting thin film by intermittently irradiating a pulsed laser beam formed in a band-shape along the longitudinal direction of the insulating substrate to the insulating substrate thereby crystallizing the semiconducting thin film; and

integratedly forming thin film transistors, each including the semiconducting thin film as an active layer, with a specific arrangement pitch;

wherein said laser annealing step further comprises a step of moving the laser beam relative to the insulating substrate in the lateral direction with a specific movement pitch while partially overlapping regions irradiated with the laser beam to each other, the movement pitch of the laser beam being set at a value equal to an arrangement pitch of the thin film transistors or at a value larger by a factor of an integer than the arrangement pitch of the thin film transistors.

2. A process of fabricating a semiconductor device according to claim 1, wherein said laser annealing step is performed such that any one of boundaries of the partially overlapped regions irradiated with the laser beam is not overlapped on a channel region of each of the thin film transistors.

3. A process of fabricating a semiconductor device according to claim 1, wherein the semiconducting thin film is made from amorphous silicon, and the amorphous silicon constituting the semiconducting thin film is converted into polycrystalline silicon by the laser annealing.

4. A process of fabricating a semiconductor device according to claim 1, wherein the thin film transistor has a structure including a gate electrode, a gate insulating film, and an active layer, which are arranged in this order from the insulating substrate side.

5. A process of fabricating a semiconductor device according to claim 1, wherein the thin film transistor is a pixel transistor for switching a pixel of a matrix type display.

6. A process of fabricating a semiconductor device according to claim 1, wherein the insulating substrate includes a pixel electrode corresponding to each of the thin film transistors.

7. A semiconductor device comprising:

an insulating substrate;

a plurality of thin film transistors, each including a semiconducting thin film formed on said insulating substrate as an active layer, integratedly formed with a specific arrangement pitch, said active layer being crystallized by a laser annealing step of irradiating a pulsed laser beam to said insulating substrate while partially overlapping regions irradiated with the laser beam to each other; and

an alignment mark used for positioning said insulating substrate such that any one of boundaries of the partially overlapped irradiated regions formed on said insulating substrate is not overlapped on a channel region of each of said thin film transistors.

8. A semiconductor device according to claim 7, wherein said insulating substrate includes a pixel electrode corresponding to each of said thin film transistors integratedly formed with a specific arrangement pitch.

9. A semiconductor device according to claim 7, wherein said active layer is made from polycrystalline silicon.

10. A semiconductor device according to claim 7,

wherein said thin film transistor has a structure including a gate electrode, a gate insulating film, and an active layer arranged in this order from said insulating substrate side.

11. A laser annealing apparatus used for fabrication of a thin film semiconductor device integratedly formed with thin film transistors each of which includes as an active layer a semiconducting thin film which is formed on the surface of an insulating substrate spread in longitudinal and lateral directions and then crystallized, comprising:

means for intermittently irradiating a pulsed laser beam formed in a band-shape along the longitudinal direction of the insulating substrate to the insulating substrate, and simultaneously moving the laser beam relative to the insulating substrate in the lateral direction with a specific movement pitch while partially overlapping regions irradiated with the laser beam to each other;

means for setting the movement pitch of the laser beam at a value equal to an arrangement pitch of the thin film transistors or at a value larger by a factor of an integer than the arrangement pitch of the thin film transistors; and

means for previously positioning the insulating substrate such that any one of boundaries of the partially overlapped irradiated regions is not overlapped on a channel region of each of the thin film transistors.

12. A laser annealing apparatus according to claim 11, wherein the laser beam is supplied from a laser light source.

13. A laser annealing apparatus according to claim 11, wherein said positioning means comprises a detector for irradiating light onto the surface of an alignment mark formed on the insulating substrate and detecting an amount of the light reflected from the surface of said alignment mark.

14. A laser annealing apparatus according to claim 13, wherein said light is supplied from said laser light source.

15. A laser annealing apparatus according to claim 11, wherein said moving means comprises a stage, a motor for moving said stage, and a controller for driving said motor.

16. A laser annealing apparatus according to claim 15, wherein said controller drives said motor on the basis of an output of said detector supplied to said controller.